What Is Claimed Is:

1. An apparatus for separating non-magnetic mineral values from a source material containing magnetic material and non-magnetic material, the apparatus comprising:

a first endless conveyer having a front end and a rear end, the first endless conveyer having a textured surface and having a plurality of spaced apart paddles removably mounted thereon;

a second endless conveyer positioned beneath the first conveyer in a vertically spaced relationship therewith and having a front end and a rear end, the front end of the second conveyer positioned rearward with respect to the front end of the first conveyer to define a longitudinally staggered relationship between the first conveyer and the second conveyer, the second endless conveyer being configured to receive the source material adjacent its rear end;

a motor for driving the first conveyer in a first direction and the second conveyer in a second direction opposite to the first direction such that a bottom surface of the first endless conveyer and a top surface of the second endless conveyer are driven in substantially the same direction from the respective rear ends towards the respective front ends;

a first wall and a second wall extending between the first conveyer and the second conveyer substantially along the entire length of each conveyer, the first and second walls, the bottom surface of the first endless conveyer, the top surface of the first endless conveyer, and the paddles collectively forming an enclosure within which the source material is positioned; and

a magnetic separation assembly mounted within the first endless conveyer for acting on the source material within the enclosure, the assembly having a frame for supporting discrete sections of magnets, the sections of magnets being mounted to the frame in spaced longitudinal relation to form alternating areas of presence and absence of a magnetic field such that the magnetic separation assembly permits the magnetic fields to intermittently act on the source material to progressively separate the magnetic material from the non-magnetic material as the material is transported along the second endless conveyer within the enclosure.

2. The apparatus according to claim 1, wherein the magnetic separation assembly is removably mounted within the first endless conveyer.

3. The apparatus according to claim 1, further comprising an adjustable support for supporting the first endless conveyer and the second endless conveyer

such that the first and second endless conveyers are adjustable vertically relative to one another.

4. The apparatus according to claim 1, wherein the magnetic separation assembly includes, adjacent the front end of the first endless conveyer, a magnetic section having about twice the magnetic field strength of the other of the magnetic sections.

5. The apparatus according to claim 1, wherein the motor drives the first conveyer and the second conveyer at a speed ratio of about 4:1.

6. The apparatus according to claim 1, wherein the magnetic sections are made of substantially the same magnet composition.

7. The apparatus according to claim 1, wherein at least some of the magnetic sections are made of different magnet compositions.

8. The apparatus according to claim 1, wherein the first endless conveyer is configured to receive the source material on a top surface thereof and discharge

the source material on a top surface of the second endless conveyer at the rear end thereof.

9. An apparatus for separating non-magnetic mineral values from a source material containing magnetic material and non-magnetic material, the apparatus comprising:

a frame;

a non-magnetic material collection channel mounted to the frame for collecting non-magnetic material;

a feed mechanism for supplying the source material to the collection channel;

retaining members mounted within the collection channel to retain the collected non-magnetic material;

a fluid connection on the collection channel configured to connect a source of fluid to the collection channel, the fluid transporting the source material fed from the feed mechanism along the retaining members for retaining non-magnetic material and flushing the magnetic material contained in the source material away from the retaining members; and

a magnetic separation assembly mounted adjacent the collection channel for exerting magnetic fields on the source material transported by the fluid to attract the magnetic material in the source material away from the retaining members and

to assist collection and retaining of the non-magnetic material in the retaining members.

10. The apparatus according to claim 9, wherein the magnetic separation assembly includes a frame for supporting discrete sections of magnets, the sections of magnets being mounted to the frame in spaced longitudinal relation forming alternating areas of presence and absence of a magnetic field, permitting the magnetic fields to intermittently act on the source material to progressively separate the magnetic material from the non-magnetic material during transportation along the retaining members, whereby the non-magnetic material carried by the fluid is efficiently collected and retained in the retaining members in the absence of magnetic material.

11. The apparatus according to claim 9, wherein the magnetic separation assembly includes a rotatable magnetic cross belt disposed adjacent an upstream end of the retaining members.

12. The apparatus according to claim 9, wherein the magnetic separation assembly includes a magnetic bar disposed at a downstream underside of the collection channel.

13. The apparatus according to claim 9, further comprising a removal channel adjacent the collection channel for removal of the non-magnetic material retained in the retaining members.

14. The apparatus according to claim 9, wherein the frame is configured such that the inclination of the collection channel is adjustable.

15. The apparatus according to claim 9, wherein the apparatus is configured to be collapsible.

16. The apparatus according to claim 9, wherein the retaining members are non-magnetic.

17. The apparatus according to claim 16, wherein the retaining members comprise a reticulated mat.

18. The apparatus according to claim 16, wherein the retaining members comprise a mat having Hungarian riffles.

19. The apparatus according to claim 16, wherein the retaining members comprise a mat having a diamond pattern.

20. The apparatus according to claim 9, wherein the collection channel comprises an upstream channel and a downstream channel such that the non-magnetic material retained in the retaining members within the upstream channel can be removed separately from the non-magnetic material retained in the retaining members within the downstream channel.

21. A method of dry separation of non-magnetic metal values from a source material containing the non-magnetic values and other minerals, the method comprising the steps of:

providing a plurality of spaced apart magnets each for generating a magnetic field directed to an underlying conveyer;

exposing the material on the conveyer to each of the magnetic fields in alternation in a continuous manner as the material is advanced by the conveyer;

forming substantially homogeneous strata of the minerals overlying said non-magnetic values by repeated exposure to magnetic fields followed by the absence of the fields; and

isolating the strata.

22. The method according to claim 21, wherein the source material includes black sand and minerals.

23. A method of dry separation of non-magnetic metal values from a source material containing the non-magnetic values and other minerals, the method comprising the steps of:

providing a pair of top and bottom endless conveyers in vertical spaced relation to convey the source material, the top conveyer including a plurality of spaced apart magnets each generating a magnetic field directed to the bottom conveyer;

exposing the material on the bottom conveyer to each of the magnetic fields in alternation in a continuous manner as the material is advanced by the bottom conveyer;

forming substantially homogeneous strata of the minerals overlying said non-magnetic values by repeated exposure to magnetic fields followed by the absence of the fields; and

isolating the strata.

24. The method according to claim 23, wherein the source material includes black sand and minerals.

25. A method of wet separation of non-magnetic metal values from a source material containing non-magnetic material and magnetic material, the method comprising the steps of:

providing a non-magnetic material collection channel for collecting non-magnetic material;

feeding the source material to the collection channel;

treating the source material with a fluid in the collection channel to transport the source material along a retaining member for retaining non-magnetic material, the fluid flushing materials other than the non-magnetic metal values away from the retaining member; and

providing a magnetic separation assembly adjacent the collection channel, the assembly having discrete sections of magnets, the sections of magnets in spaced longitudinal relation forming alternating areas of presence and absence of a magnetic field for permitting the magnetic fields to intermittently act on the source material to progressively separate the magnetic material from the non-magnetic material during transportation along the retaining member, the non-magnetic material carried by the fluid being efficiently collected and retained in the retaining member in the absence of magnetic material.

26. A mineral separation assembly suitable for separating metal values from a source of material containing non-magnetic values and other minerals, the assembly comprising:

a frame for supporting discrete sections of magnets, the sections of magnets being mounted to the frame in spaced longitudinal relation forming alternating areas of presence and absence of a magnetic field;

a spacer mechanism for spacing and maintaining the magnets within an individual section;

a magnetic shield for shielding the frame from magnetic fields generated from the magnets; and

directing means for directing magnetic fields in each section of the sections in a coaxial relationship such that, upon interaction with the assembly, the magnetic fields intermittently act on the source material to progressively separate the magnetic material from the non-magnetic material to assist collection and retainment of the non-magnetic material in a retainer.

27. A separation apparatus for separating a target material from a source material, the apparatus comprising:

a carrier for transporting the source material along a predetermined path; and

a magnetic field generator including a plurality of magnets for forming alternating areas of presence and absence of a magnetic field along the predetermined path so that the magnetic fields intermittently act on the source material transported by the carrier to progressively separate the target material from the source material, the strength of the magnetic fields being such that not only magnetic materials in the source material are affected as being attracted, but also conductive non-magnetic materials in the source material are affected by virtue of induction, causing repulsion of the conductive non-magnetic materials away from the magnetic field.

28. The apparatus according to claim 27, wherein the carrier comprises a first endless conveyer and a second endless conveyer underneath the first endless conveyer, and

wherein the second endless conveyer is configured to receive the source material at an entry end.

29. The apparatus according to claim 28, wherein the magnetic field generator comprises:

a frame for supporting discrete sections of the magnets, the sections of magnets being mounted to the frame in spaced longitudinal relation forming said alternating areas of presence and absence of the magnetic field; and

a spacer to maintain the magnets within individual sections,

wherein the magnetic generator is mounted within the first endless conveyer.

30. The apparatus according to claim 29, further comprising a collector adjacent an exit end of the first conveyer for separately collecting the target material and other materials contained in the source material.

31. The apparatus according to claim 27, wherein the carrier comprises:

a frame a flow channel therein;

retaining members mounted within the flow channel for retaining the target material; and

fluid transport channel configured to receive the source material and a fluid substance at one end of the flow channel to mix the source material with the fluid substance and to guide the mixture to the flow channel so that the source material

is transported by the fluid substance along the flow channel over the retaining member.

32. The apparatus according to claim 31, wherein the magnetic field generator comprises:

a frame for supporting discrete sections of the magnets, the sections of magnets being mounted to the frame in spaced longitudinal relation forming said alternating areas of presence and absence of the magnetic field; and

a spacer to maintain the magnets within individual sections,

wherein the magnetic generator is mounted adjacent the flow channel.

33. The apparatus according to claim 27, wherein the target material includes toxic substances included in the source material.

34. The apparatus according to claim 27, wherein the target material includes a metal value included in the source material.

35. The apparatus according to claim 27, wherein the magnetic field generator comprises:

a frame for supporting discrete sections of magnets, the sections of magnets being mounted to the frame in spaced longitudinal relation forming said alternating areas of presence and absence of the magnetic field; and

a spacer to maintain the magnets within individual sections.

36. The apparatus according to claim 35, wherein said magnets are permanent magnets.

37 The apparatus according to claim 35, wherein said magnets each have an MGO_e of 27 or greater.

38. A method for separating a target material from a source material, the method comprising the steps of:

transporting the source material along a predetermined path; and

forming alternating areas of the presence and absence of a magnetic field along the predetermined path so that the magnetic fields intermittently act on the source material transported along the predetermined path to progressively separate the target material from the source material, the strength of magnetic fields being such that not only magnetic materials in the source material are affected as being attracted, but also conductive non-magnetic materials in the source material are affected by virtue of induction, causing effective repulsion of the conductive non-magnetic materials away from the magnetic field.

39. The method according to claim 38, wherein the step of forming includes providing a plurality of sections of magnets spaced apart longitudinally, and

wherein the step of transporting the source material includes the steps of feeding the source material at an entry end of an endless conveyer so that the source material is transported past the sections of magnets such that the magnetic

fields of the magnets intermittently act on the source material transported on the conveyer.

40. The apparatus according to claim 38, wherein the step of transporting the source material includes the steps of:

mixing the source material with a fluid substance; and

directing the mixture along the flow channel so that the source material is transported by the fluid substance along the flow channel.

41. The apparatus according to claim 38, wherein the step of transporting the source material includes the step of feeding a source material that includes toxic substances, the toxic substances being the target material to be separated.

42. The apparatus according to claim 38, wherein the step of transporting the source material includes the step of feeding a source material that includes metal values, the metal values being the target material to be separated.

43 The apparatus according to claim 38, wherein the step of forming the alternating areas of presence and absence of the magnetic field includes the step of

providing a magnetic field strength having an MGO_e of greater than or substantially equal to 27 at maximum in areas where the magnetic field is present.

44. A method for separating and disposing of a toxic substance from a source material in an environmentally clean manner, the method comprising the steps of:

receiving the source material including the toxic substance;

transporting the source material along a predetermined path;

forming alternating areas of presence and absence of a magnetic field along the predetermined path to exert the magnetic fields intermittently on the source material that is being transported along the predetermined path to progressively separate the toxic substance from the source material, the strength of magnetic fields being such that not only magnetic materials in the source material are affected as being attracted, but also conductive non-magnetic materials in the source material are affected by virtue of induction, causing effective repulsion of the conductive non-magnetic materials away from the magnetic field; and

collecting the toxic substance separated in the step of forming.

45. The method according to claim 44, wherein the step of forming the alternating areas of presence and absence of the magnetic field includes the step of providing a magnetic field strength having an MGO_e of greater than or substantially equal to 27 at maximum in areas where the magnetic field is present.

46. An apparatus for separating non-magnetic substances from a source material containing magnetic material and non-magnetic material, comprising:

a plurality of magnetic separating stations longitudinally spaced apart to provide alternating areas of a strong magnetic field and the absence of a strong magnetic field;

a conveyer for moving the source material beneath the magnetic separating stations such that at a magnetic separating station magnetic material within the source material is attracted away form the conveyer to the magnetic station and non-magnetic material is not attracted to the magnetic station and remains on the conveyer, the conveyer having a discharge end;

a scraper for periodically separating the magnetic material from each of the magnetic stations such that the magnetic material falls onto the conveyer to form a layer of the magnetic material in areas of the conveyer transporting the non-magnetic material thereon, wherein each downstream magnetic separating station acts on the source material on the conveyer to further separate the magnetic material from the non-magnetic material;

a non-magnetic material receptacle located proximate the discharge end and a magnetic material receptacle located proximate the discharge end; and

a discharge separating device located proximate the discharge end to cause substantially only the separated non-magnetic material to be discharged into the non-magnetic material receptacle and substantially only the separated magnetic material to be discharged into the magnetic material receptacle.

47. The apparatus according to claim 46, further including a mechanism for causing the magnetic material attracted to at least one of the magnetic stations to be agitated to induce physical separation of non-magnetic material that may be attached to the magnetic material attracted to the at least one magnetic station.

48. The apparatus according to claim 47, wherein the mechanism comprises a continuous belt that slidingly passes between the at least one magnetic station and the magnetic material attracted thereto to cause the attracted material to be tumblingly agitated without being discharged from the strong magnetic field.

49. The apparatus according to claim 48, wherein the continuous belt includes a rippled surface.

50. The apparatus according to claim 46, wherein the discharge separating device comprises an additional magnetic station.

51. The apparatus according to claim 46, further including a wet separation device for receiving and processing the non-magnetic material in the non-magnetic material receptacle using a fluid and an additional strong magnetic field to further separate any magnetic material contained in the material in the non-magnetic material receptacle.

52. A method for separating non-magnetic substances from a source material containing magnetic material and non-magnetic material, the method comprising the steps of:

providing alternating areas of a strong magnetic field and the absence of a strong magnetic field via a plurality of magnetic separating stations longitudinally spaced apart;

moving the source material via a conveyer located beneath the magnetic separating stations such that at a magnetic separating station magnetic material within the source material is attracted away form the conveyer to the magnetic station and non-magnetic material is not attracted to the magnetic station and remains on the conveyer;

periodically scraping and separating the magnetic material from each of the magnetic stations such that the magnetic material falls onto the conveyer to form a layer of the magnetic material in areas of the conveyer transporting the non-magnetic material thereon, wherein each downstream magnetic separating station acts on the source material on the conveyer to further separate the magnetic material from the non-magnetic material;

discharging substantially only the separated non-magnetic material into a non-magnetic material receptacle and discharging substantially only the separated magnetic material into a magnetic material receptacle.

53. The method according to claim 52, further comprising the step of agitating the magnetic material attracted to at least one of the magnetic stations to induce physical separation of non-magnetic material that may be attached to and incorporated into the magnetic material attracted to the at least one magnetic station.

54. The method according to claim 53, wherein the step of agitating includes the step of causing the attracted material to be tumblingly agitated without being discharged from the strong magnetic field via a continuous belt that slidingly passes between the at least one magnetic station and the magnetic material attracted thereto.

55. The method according to claim 54, wherein the continuous belt includes a rippled surface.

56. The method according to claim 52, wherein the step of discharging the magnetic material includes the step of attracting the magnetic material via an additional magnetic station.

57. The method according to claim 52, further comprising the steps of receiving and processing the non-magnetic material in the non-magnetic material receptacle using a fluid and an additional strong magnetic field to further separate any magnetic material contained in the material in the non-magnetic material receptacle.